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A comparison of the socioeconomic characteristics, dietary practices, and health status of women food shoppers with different food price attitudes

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Abstract

A person's attitude toward food price could influence food purchase decisions and, consequently, impact diet quality. The aim of the study was to compare soicoeconomic, dietary, and health status of women food shoppers who considered food price very important (n = 1322) with those of women who did not consider food price very important (n = 1272). These women planned and prepared their household meals. Data from US Department of Agriculture's Diet and Health Knowledge Survey, 1994 to 1996, and Continuing Survey of Food Intake by Individuals, 1994 to 1996, were used. The socioeconomic characteristics, dietary intakes, fat reduction practices, and health status were estimated. A priori, pairwise mean comparisons, at α = .05 level of significance, were made. Food price was very important to 46.8% of women. More African-American and Hispanic women food shoppers were likely to consider food price very important when buying food. The women who considered food price very important were more likely to live in low-income, food-insecure households; receive food stamps; have low education; rent and not own homes; and be employed as service workers. They consumed 17 kJ less energy. Yet, the energy density of their diet was 11 kJ/kg more than that of the other group. They ate a low amount of relatively high-price foods like nonstarchy vegetables and drank more sweetened fruit drinks that are an inexpensive source of energy. A low percentage of them adopted dietary fat reduction strategies and read food labels. They are more likely to be overweight and have health conditions such as high blood pressure, heart disease, and diabetes than the others. Dietitians working with low-income food shoppers should address cost-effective ways to buy seasonally available fruits and vegetables and promote dietary fat reduction strategies.

Keywords: Women; Food price; Attitudes; Dietary practices; Low income; Overweight

1. Introduction

It is imperative that people make healthful food choices because diet influences health. Health conditions such as obesity, cardiovascular disease, type 2 diabetes, certain types of cancer, and osteoporosis are attributable to poor dietary intakes [1-7]. Socioeconomic status affects food choices and dietary quality. In the most recent national food consumption data, persons from low-income households had a poorer diet than those from high-income households [8].

Food price is among the many factors that influence people's food choices. Consequently, it affects energy intake and nutrient quality of diets. Fats, sweetened beverages, and grain products that are high in energy density (MJ/kg) are low in energy cost (US dollars/MJ). They serve as inexpensive energy sources and provide a low-cost option, especially in low-income people's diets [9,10]. In comparison, including nutritious fruits and vegetables in the diet could increase diet costs and could be a barrier to healthy

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eating [10-13]. The comparatively low cost of energy-dense foods, in combination with low educational status, could be a reason for the prevalence of obesity among the low-income persons [9], and obesity is a risk factor for many health conditions such as diabetes, heart disease, and hypertension [14-17]. Therefore, food price could not only impact food choices but also could impact health.

In many households, women plan and prepare meals. Therefore, their attitudes toward food price could influence their food purchase decisions which, in turn, would affect their diet quality and that of the household in general. There are no studies on the food price attitudes of women food shoppers and their dietary practices and body mass index (BMI). This study uses a nationally representative sample of women, 20 years and older, who also planned and prepared their household meals. The objectives of the study were (i) to compare the socioeconomic and demographic characteristics of women grouped based on their food price attitudes, (ii) to determine whether women who considered food price very important when buying food ate a less nutritious diet than the women who did not consider food price very important, and (iii) to examine whether there were differences between the 2 groups in their nutrition attitudes, dietary practices, and body weight and health status.

2. Methods and materials

The study included women in the US Department of Agriculture's Diet and Health Knowledge Survey (DHKS) (1994-1996) [18] who planned and prepared meals for their households. These women had complete food intake records on day 1 of the Continuing Survey of Food Intakes by Individuals (CSFII) (1994-1996). The US Department of Agriculture conducted the CSFII as a part of its national nutrition monitoring activities. Dietary intake data in the surveys were collected through an interviewer-administered, 24-hour dietary-recall method using a multiple-pass technique to reduce underreporting by the respondents [19]. The survey also collected self-reported data on height, weight, and health status. Overall, day 1 response rate for the CSFII 1994 to 1996 was 80.0% [19].

The DHKS attempted to interview 1 adult, 20 years or older, from each CSFII household. Adults who provided complete dietary information to the interviewer were eligible to participate in the DHKS. The respondents whose dietary intake data were collected through proxy interviews and respondents who were proxies were excluded from participating in the DHKS. Consequently, not all CSFII households had a DHKS respondent. The DHKS respondents were randomly selected from among the eligible CSFII respondents. The DHKS was administered through telephone. In-person interviews were conducted for households without telephones or when the telephone number was not available.

A question in the DHKS addressed the respondents' attitude toward food price when buying food. The respondents were asked how important price was to them when they bought food. The possible responses were very important, somewhat important, not too important, and not at all important. The women who considered food price very important when buying food were assigned to "food price very important" group (n = 1322), and all the others were combined and assigned to "food price not very important" group (n = 1272).

The socioeconomic and demographic distribution of the total population was analyzed (Table 1). The subgroups within the socioeconomic and demographic characteristics were age groups (20-39, 40-54, 55-64, and ≥65 years); annual household income (0% to 130% of poverty, 131% to 350% of poverty, and >350% of poverty); educational status (high school or less, 1-4 years college, and ≥5 years of college); race-ethnicity (Hispanics, non-Hispanic whites or whites, non-Hispanic blacks or African Americans, and non-Hispanic other races such as Asians, Pacific Islanders,

Table 1
Socioeconomic and demographic characteristics of women who considered food price very important when buying food

Socioeconomic and demographic characteristics	Percent distribution in the total population (n = 2594) (weighted %)	Percentage considering food price very important within socioeconomic and demographic groups (weighted %) (95% CI[a])
Age groups (y)		
20-39	39.7	46.9 (43.1-50.7)
40-54	27.1	43.3 (38.3-48.3)
55-64	14.0	46.9 (41.4-52.3)
≥65	19.3	51.1 (46.9-55.3)
Household income		
0%-130% of poverty (low)	19.7	69.0 (64.0-74.0)
131%-350% of poverty (medium)	40.0	50.9 (46.4-55.4)
>350% of poverty (high)	40.3	31.7 (27.5-35.9)
Educational status		
High school level or less	51.5	56.6 (52.6-60.6)
1-4 y of college	35.1	39.2 (34.8-43.6)
≥5 y	12.6	26.4 (20.4-32.4)
Race-ethnicity		
White	77.0	43.1 (39.6-46.6)
African Americans	11.0	70.4 (62.4-78.4)
Hispanics	8.0	53.7 (47.7-59.7)
Non-Hispanic other races[b]	4.0	37.9 (36.5-39.3)
Urbanization		
MSA, central city	32.4	48.7 (43.7-53.7)
MSA, suburban	44.9	43.0 (37.8-48.2)
Non-MSA, rural	22.7	51.5 (44.5-58.5)
Region		
Northeast	20.0	43.3 (35.3-51.3)
Midwest	24.5	45.1 (41.7-48.5)
South	35.1	54.5 (48.1-60.9)
West	20.4	38.9 (31.5-46.3)

Of the women, 46.8% said that food price was important to them when buying food.

[a] CI indicates confidence interval.

[b] Includes Asians, Pacific Islanders; American Indians, and Alaskan Natives.

American Indians, and Alaskan natives); region (Northeast, Midwest, South, and West); and urbanization (metropolitan statistical area [MSA] central city, MSA-suburban, non-MSA rural). The percentage who considered food price very important, within each socioeconomic and demographic subgroups, were estimated to examine whether there were difference in food price attitudes among these subgroups (Table 1).

Employment status and home ownership are other measures of economic status. People who are employed are more likely to have more money than those not employed. In addition, the occupation will affect income. The percentages of women who were full time, part time, or not employed; occupation type (professional/technical, manager/proprietor, sales/clerical, service worker, and operative); and percentage of women who owned or rented their homes were estimated (Table 2). Household food security status and food stamp use are indicators of food availability in homes. The percentage of women whose households were food-secure or food-insecure and percentage of those authorized to receive food stamp were estimated (Table 2). A priori, pairwise mean comparisons, at $\alpha = .05$ level of significance, were used to compare the 2 food price attitude groups.

Table 2
Employment, household food security, and home ownership by food price attitudes

Characteristics	Food price very important (weighted %) (95% CI[a])	Food price not very important[b] (weighted %) (95% CI[a])
Employment status:		
Full-time employed	31.3 (27.7-34.9)	39.0 (35.2-42.8)
Part-time employed	12.8 (10.6-15.0)	16.8 (13.6-20.0)
Not employed	51.5 (48.9-54.1)	40.9 (37.4-44.4)
Other	4.4 (2.8-6.0)	3.3 (2.0-4.6)
Occupation type[c]		
Professional/technical	24.4 (19.4-29.4)	40.8 (36.2-45.2)
Manager/proprietor	14.2 (11.2-17.2)	17.4 (13.8-21.0)
Sales/clerical	22.7 (16.7-28.7)	21.8 (18.8-24.8)
Service worker	24.2 (19.6-28.8)	13.0 (9.6-16.4)
Operative	6.1 (3.1-9.1)	2.5 (1.5-3.5)
Housing type[c]		
Owned or being bought by a household member	64.3 (62.4-66.2)	71.7 (68.7-74.7)
Rented with payment required	32.9 (29.2-36.6)	27.1 (23.9-33.5)
Household food security status[c]		
Have enough of the kind of food we want to eat (food-secure households)	71.7 (68.5-74.9)	83.3 (80.3-86.3)
Have enough but not always the kind of food we want to eat (food-insecure households)	25.7 (22.7-28.7)	15.7 (12.7-18.7)
Food stamp status[c]		
Someone in household on food stamp	14.4 (12.0-17.1)	3.7 (2.7-5.1)
Respondent authorized for food stamp	11.6 (9.3-14.5)	2.6 (1.9-3.7)

[a] CI indicates confidence interval.
[b] Includes women who said that food price was somewhat important, not too important, and not at all important.
[c] Not all categories are included.

Table 3
Mean dietary intakes and percentage of women food shoppers meeting dietary recommendations (by food-price attitudes)

Dietary intakes	Price very important (mean [95% CI[a]])	Price not very important[b] (Mean [95%CI[a]])
Energy (kJ)	382 (374-390)	399 (392-406)
Energy per 1000 g of total food consumed[c] (kJ)	220 (215-225)	209 (204-214)
Total fat (g)	60.7 (58.4-63.1)	60.6 (58.1-63.1)
Saturated fat (g)	19.9 (19.1-20.7)	20.1 (19.2-20.9)
Total carbohydrate (g)	203 (197-209)	218 (212-224)
Added sugars (g)	63 (58-67)	61 (56-65)
Dietary fiber (g)	13.0 (12.5-13.4)	14.8 (14.1-15.4)
Total fat per 1000 kcal of energy (g)	37.0 (36.4-37.6)	35.4 (34.7-36.1)
Saturated fat per 1000 kcal of energy (g)	12.1 (11.8-12.4)	11.7 (11.4-12.1)
Whole milk (g)	39 (29-49)	22 (15-28)
Low-fat and skim milk (g)	83 (75-91)	103 (94-112)
Fruits and fruit juices (g)	152 (136-167)	173 (149-196)
Total vegetables (g)	182 (169-193)	211 (195-226)
Non-starchy vegetables (g)	119 (107-129)	151 (137-165)
Not-diet fruit drinks and fruit ades (g)	55 (47-63)	39 (32-46)
Non-diet carbonated beverages (g)	187 (158-215)	159 (127-191)
Total grain products (g)	241 (229-253)	263 (250-278)
Cakes, cookies, pies and pastries (g)	31 (26.4-34.8)	41 (36.4-44.6)
Crackers, popcorn, pretzels, etc (g)	9.0 (7.0-10.9)	10.7 (9.2-12.2)
Total meat, fish, and poultry (g)	173 (158-187)	162 (149-176)
Meet total fat recommendations (%)	36.3 (33.9-38.7)	42.0 (39.4-44.6)
Meet saturated fat recommendations (%)	42.4 (39.6-45.2)	47.7 (45.5-49.9)
Meet milk recommendation (%)	14.6 (12.6-16.5)	19.1 (17.1-21.1)
Meet fruit recommendation (%)	17.8 (15.3-20.3)	21.2 (18.2-24.3)
Meet vegetable recommendation (%)	27.7 (24.8-30.6)	35.3 (31.9-38.7)
Eat a variety of food[d] (%)	46.3 (43.2-49.3)	53.6 (49.9-57.3)
Eat a good diet[e] (%)	10.5 (7.9-13.1)	15.8 (13.6-18.0)

[a] CI indicates confidence interval.
[b] Includes women who said that food price was somewhat important, not too important, and not at all important.
[c] Total food consumed includes all foods and beverages reported consumed by women. It does not include water drunk separately.
[d] Have a maximum variety score of 10.
[e] Have an HEI Score above 80.

Mean energy, energy density of the day's diet (energy per kilogram of total food amount consumed), macronutrients, macronutrient densities (amount of nutrient per 1000 kcal of energy intake), and food and beverage intakes and the percentage of women meeting dietary recommendations for total fat, saturated fat, milk group, fruit, and vegetables were estimated and compared using *t* tests (Table 3).

The Healthy Eating Index (HEI) values were used to determine the overall diet quality [20,21] (Table 3). The HEI components measure how well a diet meets the Food Guide Pyramid recommendations for grain, vegetables, fruits, milk, and meat and meat alternate groups; compliance of one's diet to the Dietary Guidelines recommendations on total fat; and saturated fat and dietary variety [22,23]. Eating the recommended number of servings is given 10 points, and not eating a food group is given a zero score for the respective food group. The HEI is the sum of the 10 component scores. A "good-quality diet" is defined as having an HEI score above 80 points [20]. Pairwise comparisons of percentages of women in eating a good diet and meeting dietary recommendations were made ($\alpha = .05$).

The health- and diet-related attitudes of the 2 groups were analyzed (Table 4). The attitude measures included in the study were: how important it is to you to maintain a healthy weight (very important, somewhat important, not too important, and not at all important); what you eat can make a big difference in your chance of getting a disease, such as heart disease or cancer (strongly agree, somewhat agree, somewhat disagree, strongly disagree); and there are so many recommendations about healthy ways to eat, it is hard to know what to believe (strongly agree, somewhat agree, somewhat disagree, strongly disagree). The percentages of women in the 2 price attitude groups, who choose the first response on the 4-point Likert scale, were estimated and compared using pairwise mean comparisons at $\alpha = .05$ level of significance.

The women's dietary practices with respect to discretionary fat were examined (Table 4). They were asked whether they used skim or 1% milk instead of whole milk; ate frozen yogurt, ice milk, or sherbet instead of ice cream; and when they ate cooked vegetables, other than potatoes, whether they ate with butter or margarine added. The response choices were: always or almost always, sometimes, rarely, or never. They were also asked about the amount of butter or margarine they used on bread or muffin (generous, moderate, light, or none); when they ate chicken, did they eat it fried (always or almost always, sometimes, rarely, never, or do not eat chicken); and when they ate chicken, whether they removed the skin (always or almost always, sometimes, rarely, or never). Except for the question on eating fried chicken, the percentages of women in the 2 food price attitude groups, who choose the first response on the 4-point Likert scale, were estimated and compared. Fried chicken is a high-fat food. Therefore, women who ate chicken always (almost always) or sometimes were combined and compared using pairwise comparisons at $\alpha = .05$ level of significance.

Generally, persons interested in eating nutritious foods read food labels. The responses to questions on reading food label information such as the list of ingredients and nutrition panel included always or almost always, sometimes, rarely, never, never seen, or don't know. The percentages of women in the 2 groups who always (or almost always) read food labels were compared (Table 4). The mean BMI, percentage of overweight women, and percentage of women who were told by their doctors that they have health conditions such as diabetes, heart disease, high blood pressure, or high blood cholesterol were estimated and

Table 4
Dietary beliefs and practices of women food shoppers by food-price attitudes

Dietary practices and beliefs	Response	Price very important (weighted %) (95% CI[a])	Price not very important[b] (weighted %) (95% CI[a])
How important it is to you to maintain a healthy weight?	Very important	79.1 (73.8-83.6)	76.0 (72.1-79.5)
What you eat can make a big difference in your chance of getting a disease like heart disease or cancer	Strongly agree	61.3 (56.4-66.0)	66.1 (62.6-69.3)
There are so many recommendations about healthy ways to eat, it is hard to know what to believe	Strongly agree	47.1 (43.2-51.0)	32.9 (29.0-37.2)
Use skim or 1% milk instead of whole milk	Always (or almost always)[c]	33.9 (30.7-37.3)	48.2 (43.9-52.6)
Eat frozen yogurt, ice milk, or sherbet instead of ice cream	Always (or almost always)	17.8 (14.4-21.7)	24.8 (21.9-28.0)
When you eat cooked vegetables, other than potatoes, do you eat them with butter or margarine added?	Always (or almost always)	27.1 (24.3-30.1)	18.3 (15.2-21.9)
Would you describe the amount of butter or margarine you usually spread on bread or muffin as:	Generous	10.1 (8.1-12.5)	6.6 (5.2-8.0)
When you eat chicken, do you eat it fried?	Always or Sometimes	52.2 (47.6-56.8)	36.9 (31.9-41.9)
When you eat chicken, do you eat it fried?	Rarely	28.6 (25.0-32.5)	38.0 (34.0-42.3)
When you eat chicken do you remove the skin?	Always (or almost always)	49.7 (47.7-51.7)	55.5 (52.0-59.0)
Read ingredients list on food labels	Always (or often)[d]	30.9 (27.5-34.3)	37.0 (34.4-39.6)
Read nutrition panel on food labels	Always (or often)[d]	39.5 (35.9-43.1)	46.8 (43.2-50.4)

[a] CI indicates confidence interval.
[b] Includes women who said that food price was somewhat important, not too important, and not at all important.
[c] Always (or almost always) is a single-response category.
[d] Always (or often) is a single-response category.

Table 5
Mean BMI and health status of women food shoppers by food-price attitudes

Weight and health status	Price very important (mean [95% CI[a]])	Price not very important[b] (mean [95% CI[a]])
Body mass index (kg/m^2)	26.9 (26.5-27.3)	25.3 (24.9-25.7)
Overweight (%[c])	55.1 (51.3-58.9)	43.8 (40.4-47.2)
Told by a doctor that she has high blood pressure (%[c])	26.9 (23.8-29.9)	18.3 (15.3-21.2)
Told by a doctor that she has diabetes (%[c])	7.8 (6.1-9.6)	4.1 (3.0-5.2)
Told by a doctor that she has heart disease (%[c])	9.2 (7.3-11.1)	5.1 (4.0-6.3)

[a] CI indicates confidence interval.
[b] Includes women who said that food price was somewhat important, not too important, and not at all important.
[c] Weighted percentages.

compared (Table 5). Pairwise mean comparisons, at $\alpha = .05$ level of significance were made.

The CSFII oversampled on vulnerable population groups such as children, low-income persons, and African Americans and Hispanics. Therefore, survey design effects were used in the analyses. All estimates reported in the study were weighted to represent the US population studied. SAS callable (SAS release 8.2, 1999-2001, SAS Institute Inc, Cary, NC) and SUDAAN software (release 9.0.0, April 2004, Research Triangle Institute, Research Triangle Park, NC) were used for analyses.

3. Results

The study showed that food price was very important to 46.8% of women who were their households' meal planners and meal preparers. The socioeconomic composition of the women in the study is in Table 1 (column 2). Most women in the study were younger than 40 years, approximately one fifth were 65 years or older, and one fifth lived in low-income households with an income below 131% of poverty. Half the women had high school level or lower education, and only approximately one tenth had 5 or more years of college education. About one tenth were either Hispanics or African Americans. More women lived in suburban areas, one third in central cities, and a fifth in the rural areas.

Analyses within socioeconomic groups showed that food price was very important to more than two thirds of women living in households with income below 131% of poverty (Table 1, column 3). In comparison, only approximately one third of women living in households with income above 350% of poverty considered food price very important. An inverse relationship was noted between education level and the percentage of women who considered food price very important. About twice as many women with high school level or lower education, compared with women having 5 years or more college education, said that food price was very important to them. Differences were noted among race-ethnic groups. More than two thirds of African Americans in the study considered food price very important. Women living in the south, compared with those living in the west, were more likely to consider food price very important.

There were differences in the percentage of those employed in the 2 attitude groups (Table 2). Only approximately one third of women who considered food price very important were employed full time, and half of them were not employed. In addition, the women considering food price very important were less likely to hold professional or technical jobs and more likely to be service workers. They were more likely to rent, and not own, their homes; live in households that were food insecure; and receive food stamp.

The women who considered food price very important had less energy, less carbohydrate, and less dietary fiber intakes but ate a more energy-dense diet than women who did not consider price very important (Table 3). A low percentage of them met the dietary recommendations for total fat and saturated fat, chose low-fat foods, and practiced fat-reduction strategies. Moreover, fewer met requirements for milk and vegetables, and only approximately one tenth ate a good diet.

Three fourths of women in each group strongly agreed that it was very important for them to maintain a healthy weight, and approximately two thirds said what they ate made a big difference in their chance of getting a disease such as heart disease or cancer (Table 4). However, almost half the women (47.1%) who considered food price very important, compared with only one third of women (32.9%) who did not consider price very important, seemed confused about the wide array of nutrition information and dietary recommendations available.

Differences were seen between the 2 groups in the percentages of women practicing dietary fat reduction strategies (Table 4). A smaller percentage of women who considered food price very important chose lower-fat milk products over high-fat milk products; more always (or almost always) added table fat to cooked vegetables other than potatoes, used a generous amount of table fat on bread and muffin, and ate chicken as fried chicken; and fewer read food labels.

The mean BMI of these women were higher than that of women who did not consider food price very important when food shopping (Table 5). More of them were overweight and more of them had health conditions such as diabetes, heart disease, and high blood pressure.

4. Discussion

African Americans and Hispanics, compared with Whites, were more likely to consider food price very important when buying food. Food price was very important to more women living in low-income households, having

low education, or not employed. There is a wide discrepancy in the earning capacity of persons based on education. In the 2002 Consumer Expenditure Survey, the average annual income of persons with less than high school education was 25 564 dollars, although high school graduates earned 39 618 dollars, and college graduates with master's or doctoral or professional degrees earned 92 783 dollars [24].

Among women who considered food price very important, fewer women held professional or technical jobs, and more women were service workers. Persons holding a professional or a technical position are likely to earn a high income than persons who are service workers. In 2002, the average income of managers and professionals in the United States was 80 469 dollars; that of technical, sales, and clerical workers was 49 363 dollars; and that of service workers was 35 108 dollars [24]. Money concerns and lack of time are some of the barriers to healthful eating among low-income individuals [25]. Being concerned about food price was correlated with more households being food-insecure and being authorized to receive food stamp.

Although the percentages of women owning homes were statistically different between the groups, a substantially high proportion of women in both groups lived in houses either owned by a household member or being bought. Low-income households spent a high proportion of their income for housing [26]. It is possible that some of the women who considered food price very important were paying a high proportion of their household income for mortgage, home insurance, and property tax payment and, hence, had a small percentage of income available for food purchase. The CSFII did not include the reasons why the respondents considered food price very important. Therefore, one could only speculate the reasons for their attitude toward food price. This is one of the limitations of the study.

The women who considered food price very important consumed 17 kJ less energy than others. Yet, they consumed 11 kJ more energy per kilogram of total food amount (includes beverages, does not include water) consumed. They also consumed the same amount of total fat as the other group. Therefore, their overall diet was characterized by high energy density and fat density. Their food choices and dietary practices were the reasons for a smaller proportion of them meeting the dietary recommendations for total and saturated fats. For example, their total fluid milk intake consisted of a high proportion of whole milk and a low proportion of low-fat or skim milk. A high percentage of them always added table fat such as butter or margarine on cooked vegetables, always used a generous amount of butter or margarine on bread or muffin, and ate chicken as fried chicken, and a low percentage of them, when eating chicken, removed chicken skin or rarely ate fried chicken.

Diets high in energy density are associated with lower costs [27] and relatively low nutritional quality [4,28]. In this study, a smaller proportion of women who considered price very important, compared with the others, had adequate intakes of fruits, vegetables, and milk; and a small proportion of them ate a good diet. Eating fruits, vegetables, and cooked grains will reduce the energy density of the total diet [29].

In addition, research shows that diets high in fat and sugars are associated with lower diet costs, and increasing dietary fruit and vegetables are associated with increased diet costs [9,12]. The women who considered food price very important drank a higher amount of less-expensive sweetened beverages such as fruit drink and fruit ades. Their total vegetable intake, especially nonstarchy vegetable intake, was low. Nonstarchy vegetables, in general, are more expensive than starchy vegetables.

In spite of their low energy intake, women who considered food price very important had a high mean BMI value. A difference of 1.6 kg/m^2 in the mean BMI of the 2 groups of women was noted. In addition, 11% more women who considered food price very important were overweight. Low economic status could result in eating a low-cost, energy-dense diet and, hence, may be a reason for the prevalence of overweight among low-income persons [9,30,31].

The women in both groups were aware of diet and disease relationship. About two thirds of women in both groups agreed that what they ate could make a big difference in their chance of getting a disease such as heart disease or cancer. And yet, more women who considered food price very important reported having heart disease, diabetes, or high blood pressure, the health conditions associated with poor dietary practices [3,32] and obesity [1,2,6,7,13-15].

Many women who considered food price very important were confused about the wide array of dietary recommendations available. Their low educational status may be a reason for their inability to understand food label information and dietary recommendations. Reading food labels has been strongly associated with reduced fat intakes [33]. Nutrition education on how to read and use food labels to reduce fat intake is necessary for women with low education. Another reason for the lack of clarity about dietary recommendations among a high proportion of women in the study could be that the public is exposed to a plethora of conflicting dietary messages from many sources such as the government, health organizations, researchers, news media, magazines, food industry, dietary supplement industry, and diet book authors.

Drewnowski [10] pointed out, eating fruit and vegetables were positively associated with food cost, and therefore, recommending costly diets to low-income, low-education population groups would generate frustration. However, increasing fruit, vegetable, and cooked grain intakes will decrease energy density and energy intake and, therefore, provide a strategy for weight management [29]. Dietitians working with low-income food shoppers, especially those living in food-stamp households should address cost effective ways to buy seasonally available fruit and vegetables, provide dietary fat reduction strategies, and

encourage them to choose and eat whole grains. Growing home and community vegetable gardens may be an option, where possible. In health interventions aimed to improve the diet of low-income population, distribution of coupons to buy fruit and vegetables may increase affordability [34].

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